

Application Serial No. 10/695,214
Response dated April 9, 2007
Office Action dated February 8, 2007

Proposed Amendments to the Claims

1. (Currently Amended) A fuel cell electrode catalyst, comprising:
 - a carbon supporting structure comprising carbon aerogel, said carbon aerogel having a surface area of greater than or equal to $400 \text{ m}^2/\text{g}$ and an average pore size of greater than 4 or equal to 3 nm; and
 - a plurality of crystals of metal atoms dispersed on said supporting structure, said crystal being about 1 nm to about 4 nm in diameter.
2. (Original) The fuel cell electrode catalyst of claim 1, wherein said crystals of said metal atoms are dispersed on internal surfaces of said supporting structure and external surfaces of said supporting structure.
3. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein a dispersion rate of said crystals of said metal is greater than or equal to 35%.
4. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein a dispersion rate of said crystals of said metal is greater than or equal to 50%.
5. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein a dispersion rate of said crystals of said metal is greater than or equal to 70%.
6. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein a dispersion rate of said crystals of said metal is greater than or equal to 90%.
7. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said crystals of said metal have chemically active surface areas of greater than or equal to $100 \text{ m}^2/\text{g}$.
8. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said crystals of said metal have chemically active surface areas of greater than or equal to $150 \text{ m}^2/\text{g}$.

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9. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said crystals of said metal have chemically active surface areas of greater than or equal to 200 m²/g.

10. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said crystals of said metal have chemically active surface areas of greater than or equal to 250 m²/g.

11. (Currently Amended) The fuel cell electrode catalyst of claim 1, wherein said catalyst is for a cathode ~~catalyst~~ and said ~~cathode~~ catalyst has a pore size greater than or equal to 15 nm.

12. (Currently Amended) The fuel cell electrode catalyst of claim 1, wherein said catalyst is for an anode ~~catalyst~~ and said ~~anode~~ catalyst has a pore size greater than or equal to 15 nm.

13. (Original) The fuel cell electrode catalyst of claim 1, wherein said metal is selected from the group of metals consisting of iron, cobalt, magnesium, nickel, titanium, chromium, copper, platinum, gold, silver, rhodium, ruthenium, palladium, iridium, and combinations of the foregoing metals.

14. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said metal includes platinum and wherein said metal content is greater than or equal to 1 wt. % of total catalyst.

15. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said metal includes platinum and wherein said metal content is greater than or equal to 5 wt. % of total catalyst.

16. (Previously Presented) The fuel cell electrode catalyst of claim 1, wherein said metal includes platinum and wherein said metal content is greater than or equal to 20 wt. % of total catalyst.

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17. (Withdrawn) An MEA for a fuel cell, said MEA comprising:
a solid electrolyte membrane; and
electrode catalyst layers disposed on said solid electrolyte membrane, said
electrode catalyst layers comprising an anode catalyst layer and a cathode
catalyst layer;
wherein each of said electrode catalyst layer comprises a fuel cell electrode
catalyst, said fuel cell electrode catalyst comprising,
a carbon supporting structure comprising carbon aerogel, said
carbon aerogel having a surface area of greater than about $400\text{ m}^2/\text{g}$ and a pore
size of greater than about 4 nm, and
a plurality of crystals of metal atoms dispersed on said supporting
structure, said crystal being about 1 nm to about 4 nm in diameter.

18. (Withdrawn) The MEA of claim 17, wherein said solid electrolyte
membrane comprises a proton-conducting perfluorinated ionomer.

19. (Withdrawn) The MEA of claim 17, wherein a pore size of said catalyst
supporting structure is greater than about 15 nm for the cathode catalyst layer.

20. (Withdrawn) The MEA of claim 17, wherein a pore size of said catalyst
supporting structure is greater than about 15 nm for the anode catalyst layer.

21. (Withdrawn) The MEA of claim 17, wherein said metal is selected from the
group of metals consisting of iron, cobalt, magnesium, nickel, titanium,
chromium, copper, platinum, gold, silver, rhodium, ruthenium, palladium,
iridium, and combinations of the foregoing metals.

22. (Withdrawn) The MEA of claim 17, wherein said electrode catalyst is
deposited onto said solid electrolyte membrane as paste, slurry, or ink, said paste,
slurry, or ink being in the form of a powder and a binder.

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23. (Withdrawn) The MEA of claim 22, wherein said electrode catalyst is deposited onto said solid electrolyte membrane to a thickness of less than about 100 μm .

24. (Withdrawn) The MEA of claim 22, wherein said electrode catalyst is deposited onto said solid electrolyte membrane to a thickness of less than about 20 μm .

25. (Withdrawn) The MEA of claim 22, wherein said electrode catalyst is deposited onto said solid electrolyte membrane to a thickness of less than about 10 μm .

26. (Withdrawn) The MEA of claim 17, wherein said fuel cell is a PEM fuel cell.

27. (Withdrawn) The MEA of claim 17, wherein said fuel cell is a DM fuel cell.